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EXAMINER	
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ART UNIT	PAPER NUMBER
1637	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,371	HASTWELL ET AL.	
	Examiner	Art Unit	
	STEPHANIE K. MUMMERT	1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 May 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's amendment filed on May 18, 2009 is acknowledged and has been entered. Claims 1-13 are pending.

Claims 1-13 are discussed in this Office action.

All of the amendments and arguments have been thoroughly reviewed and considered but are not found persuasive for the reasons discussed below. Any rejection not reiterated in this action has been withdrawn as being obviated by the amendment of the claims. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

This action is made FINAL.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 11-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Huang (US PgPub 2002/0136978; September 2002; 102(e) date for corresponding issued US Patent 6,855,501; February 15, 2005; citations will be applied based on the PgPub document, with the earlier publication date).

With regard to claim 11, Huang teaches a substrate having;

a support (paragraph 137-140, where the photoreceptor support comprises a cylinder, drum or belt, see Figure 9 and 10); a conductive layer on the support (p. 2, paragraph 13, where the support includes chargeable particles; Figure 7, where 150 comprises the photoreceptor and comprises a conductive layer on the surface); a photoconductive layer of a material which is adapted to have an electrostatic charge thereon selectively dissipated upon receiving incident radiation, the photoconductive layer disposed on the conductive layer (p. 2, paragraph 13, where the support includes chargeable particles; Figure 7, where 150 comprises the photoreceptor and comprises a conductive layer on the surface and where the charge can be dissipated upon illumination; see paragraph 14 where the charged carrier particles comprise zinc oxide, a photoconductive layer); and a chemically functional layer on the photoconductive layer, the chemically functional layer providing a protective layer for the photoconductive layer and a chemically reactive surface for compounds deposited on the surface (paragraph 21, where the carrier particles can include chemical compounds prior to transfer to the target surface; paragraph 44; see Figure 7);

whereby electrostatic charge patterns may be formed in a selected array upon the substrate to influence the movement of charged droplets in a liquid medium on the substrate (Figure 7, where the conductive layer is exposed to illumination, forming a charge pattern on the substrate and where nucleotides are attracted to the exposed portions; p. 2, paragraph 17, where the particles are in liquid form).

With regard to claim 12, Huang teaches a substrate adapted for manufacture of DNA arrays, the substrate having:

a support (paragraph 137-140, where the photoreceptor support comprises a cylinder, drum or belt, see Figure 9 and 10); a conductive layer on the support (p. 2, paragraph 13, where the support includes chargeable particles; Figure 7, where 150 comprises the photoreceptor and comprises a conductive layer on the surface); a photoconductive layer of a material which is adapted to have an electrostatic charge thereon dissipated upon receiving incident radiation, the photoconductive layer disposed on the conductive layer (p. 2, paragraph 13, where the support includes chargeable particles; Figure 7, where 150 comprises the photoreceptor and comprises a conductive layer on the surface and where the charge can be dissipated upon illumination; see paragraph 14 where the charged carrier particles comprise zinc oxide, a photoconductive layer); and a chemically functional layer on the photoconductive layer, the chemically functional layer providing a protective layer for the photoconductive layer (paragraph 21, where the carrier particles can include chemical compounds prior to transfer to the target surface; paragraph 44; see Figure 7); whereby electrostatic charge patterns may be formed in a selected array upon the substrate to influence the movement of charged droplets in a liquid medium on the substrate (Figure 7, where the conductive layer is exposed to illumination, forming a charge pattern on the substrate and where nucleotides are attracted to the exposed portions; p. 12, paragraph 171-175, where the process of applying the basic substrate to the manufacture of arrays of biopolymers and incorporating protecting groups is described; p. 2, paragraph 17, where the particles are in liquid form); the chemically functional layer comprising at least in part a chemically active material to which a binder molecule can be attached, whereby a selected electric charge pattern may be generated upon the substrate by incident radiation to enable selective chemical de-protection of the binder molecules or DNA oligomers already joined to a binder molecule and

application of nucleotides to selected binder molecules or to DNA oligomers already joined to a binder molecule (Figure 7, where the conductive layer is exposed to illumination, forming a charge pattern on the substrate and where nucleotides are attracted to the exposed portions; p. 12, paragraph 171-175, where the process of applying the basic substrate to the manufacture of arrays of biopolymers and incorporating protecting groups is described).

With regard to claim 13, Huang teaches a substrate adapted for manufacture of DNA arrays, the substrate having:

a support (paragraph 137-140, where the photoreceptor support comprises a cylinder, drum or belt, see Figure 9 and 10); a conductive layer on the support (p. 2, paragraph 13, where the support includes chargeable particles; Figure 7, where 150 comprises the photoreceptor and comprises a conductive layer on the surface); a photoconductive layer of a material which is adapted to have an electrostatic charge thereon selectively dissipated upon receiving incident radiation, the photoconductive layer disposed on the conductive layer (p. 2, paragraph 13, where the support includes chargeable particles; Figure 7, where 150 comprises the photoreceptor and comprises a conductive layer on the surface and where the charge can be dissipated upon illumination; see paragraph 14 where the charged carrier particles comprise zinc oxide, a photoconductive layer); and a chemically functional layer on the photoconductive layer, the chemically functional layer providing a protective layer for the photoconductive layer (paragraph 21, where the carrier particles can include chemical compounds prior to transfer to the target surface; paragraph 44; see Figure 7);

whereby electric charge patterns may be formed in a selected array upon the substrate to influence the movement of charged droplets in a liquid medium on the substrate (Figure 7, where

the conductive layer is exposed to illumination, forming a charge pattern on the substrate and where nucleotides are attracted to the exposed portions; p. 2, paragraph 17, where the particles are in liquid form); the chemically functional layer providing a surface to which a binder molecule can be attached (p. 12, paragraph 164, where the solid surface can include reactive groups such as carboxyl groups, amino groups, hydroxyl groups and the like and paragraph 165, where the substrate can be composed of silica or silica-based materials such as glass).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being obvious over Huang (US PgPub 2002/0136978; September 2002; 102(e) date for corresponding issued US Patent 6,855,501; February 15, 2005; citations will be applied based on the PgPub document, with the earlier publication date) in view of Cabuz et al. (US Patent 6,184,608; February 2001).

With regard to claim 1, Huang teaches a substrate adapted for selective micron and nanometer scale deposition, the substrate having; a support (paragraph 137-140, where the photoreceptor support comprises a cylinder, drum or belt, see Figure 9 and 10); a conductive layer on the support (p. 2, paragraph 13, where the support includes chargeable particles; Figure 7, where 150 comprises the photoreceptor and comprises a conductive layer on the surface); and

a chemically functional layer, the chemically functional layer providing a protective layer for the dielectric layer and a chemically reactive surface for compounds deposited on the surface (paragraph 21, where the carrier particles can include chemical compounds prior to transfer to the target surface; paragraph 44; see Figure 7); whereby electrostatic charge patterns may be formed in a predetermined manner upon or in the substrate (Figure 7, where electrostatic charge patterns are formed through illumination of selected regions, exposing locations for coupling and where the remainder of the support is charged; see also p. 2, paragraph 23, p. 3, paragraph 31).

With regard to claim 3, Huang teaches an embodiment of claim 1 wherein the conductive layer is combined with the support (p. 2, paragraph 13, where the support includes chargeable particles; Figure 7, where 150 comprises the photoreceptor and comprises a conductive layer on the surface and therefore where the layer is combined with the support).

With regard to claim 4, Huang teaches an embodiment of claim 1 wherein the conductive layer is a very thin layer and is transparent (p. 2, paragraph 13, where the support includes chargeable particles less than 50 um in diameter and is therefore 'very thin'; Figure 7, where 150 comprises the photoreceptor and comprises a conductive layer on the surface).

With regard to claim 5, Huang teaches an embodiment of claim 1 wherein the conductive layer conductive layer is vacuum-deposited onto the support (p. 5, where the substrate is coated using a variety of techniques for deposition including forming a thin film; and where it is noted that the claim is drawn to a product by process and absent a showing that the process of applying the conductive layer imposes a structural difference in the final product, any type of deposition which places the conductive layer on the substrate anticipates the claim).

With regard to claim 6, Huang teaches an embodiment of claim 1 wherein the conductive layer is selected from the group comprising a sputtered layer of metal or indium tin oxide, or a carbon nano-tube layer (p. 2, paragraph 14, where the support can comprise carrier particles comprising metal oxides including zinc oxide; p. 12, paragraph 165, where the support can be coated, metals or metal oxides may also be used).

With regard to claim 8, Huang teaches an embodiment of claim 1 wherein the dielectric layer is a photoconductor (Figure 7, where the support is considered a photoreceptor and where the photoreceptor comprises the support, conductive layer comprising charged material and a dielectric layer of the support which can hold the charged particles; p. 2, paragraph 14, where the support can comprise carrier particles that include metal oxides including zinc oxide).

With regard to claim 9, Huang teaches an embodiment of claim 8 wherein the photoconductor is selected from the group comprising zinc oxide, cadmium sulphide, lead sulphide, lead selenide, amorphous selenium, doped selenium, alloys of selenium including selenium-tellurium, selenium-arsenic, organic photoconductive materials including polyvinylcarbazole (PVK) and complexes of polyvinylcarbazole sensitised with trinitrofluorenone (p. 2, paragraph 14, where the support can comprise carrier particles that include metal oxides including zinc oxide).

Regarding claim 10, Huang teaches two separate supports, however, Huang teaches the target support can comprise a chemical functional layer as follows, and renders claim 10 obvious in view of the photoreceptor support and target supports considered together.

With regard to claim 10, Huang teaches an embodiment of claim 1 wherein the chemically functional layer is a material selected from the group comprising a silane polymer,

silicon dioxide, silicon nitride (SixNy), titanium dioxide, Tyzor TM, cross-linked or partially cross-linked epoxy novolac resins, polymerised oligomers, cross-linked resins, functionalised parylene (a polymer of di-para-xylyene), acrylates and methacrylates which may include functional groups, multi-functional acrylates and methacrylates, monomers which have been crosslinked with a photoinitiator (p. 12, paragraph 164, where the solid surface can include reactive groups such as carboxyl groups, amino groups, hydroxyl groups and the like and paragraph 165, where the substrate can be composed of silica or silica-based materials such as glass).

Furthermore, regarding claim 1, Huang does not teach a dielectric layer which is disposed on the conductive layer. Cabuz teaches a dielectric layer disposed on a conductive layer (Abstract).

With regard to claim 1, Cabuz teaches a support, a conductive layer on the support, a dielectric layer of material which will hold an electrostatic charge, the dielectric layer disposed on the conductive layer (Abstract; col. 1, lines 62-65, where thin layers of conductive film and dielectric materials are deposited on sheets; col. 5, lines 26-40, where the dielectric layer is deposited on a conductive layer).

With regard to claim 2 and 7, Cabuz teaches a claim 1 wherein the support is selected from the group comprising a metal, glass, ceramic, or polymeric material and the support is clear or opaque and flexible or rigid (col. 2, lines 23-34, where the support comprises polymeric materials; see col. 2, line 64 to col. 3, line 15, where the polymers comprise polyiimide, mylar or other flexible polymers; col. 1, lines 62-65, where thin layers of conductive film and dielectric materials are deposited on sheets and see also col. 5, where dielectric films comprise metallic

materials like aluminum oxide) and wherein the dielectric layer is selected from the group comprising a glass, a polymeric resin and a methylmethacrylate (MMA) (col. 2, lines 23-34, where the support comprises polymeric materials; col. 1, lines 62-65, where thin layers of conductive film and dielectric materials are deposited on sheets and see also col. 5, where dielectric films comprise metallic materials like aluminum oxide).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Cabuz into the charged support of Huang to arrive at the claimed invention with a reasonable expectation for success. Cabuz teaches "thin layers of conductive films and dielectric materials are deposited on the sheets to form a plurality of electrodes associated with the array of unit cells in a conventional manner" (col. 1, lines 62-65). While Cabuz is directed to microactuators and Huang is directed to a photoconductor support, both references teach the formation of arrays on flexible surfaces with conductive characteristics. Specifically, Huang teaches the formation of a charged surface and "In one embodiment, the first substrate is flexible, e.g., paper or a transparency or transparency-like surface" (paragraph 87). Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to have incorporated the teachings of Cabuz into the charged support of Huang to arrive at the claimed invention with a reasonable expectation for success.

Response to Arguments

Applicant's arguments filed May 18, 2009 have been fully considered but they are not persuasive.

Applicant traverses the rejection of claims 11-13 as being anticipated by Huang. Applicant argues the features of Huang and notes "both the chargeable particles and the charged carrier particles are attracted to the surface (151) and then transferred to the target substrate (164)". Applicant concludes "a person with ordinary skill in the art would not consider the chargeable particles and the charged carrier particles as part of the substrate under these circumstances, as required by independent claims 11-13" (emphasis added by Applicant, p. 2 of remarks).

Applicant goes on to assert regarding the chemical functional layer, "the attached particles, including the chemical compounds, are then transferred from the surface (151) to the target substrate (164) via printing". Applicant concludes, "a person with ordinary skill in the art would not consider the chemical compounds contained in the chargeable particles as part of the substrate under these circumstances, as required by independent claims 11-13" (emphasis added by Applicant, p. 3 of remarks). Applicant also asserts "at best, this can be read as teaching an electrically functional surface to which charged particles attach electrostatically. Since the particles are subsequently transferred to the target substrate (164), the chemical compounds/charged particles are clearly NOT chemically attached to the surface (151)" (emphasis added by Applicant, p. 3 of remarks).

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., conductive layer/chemical layer as part of the substrate) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

While Applicant may intend for the individual layers to be "a part" of the substrate, which it appears from applicant's argument would imply that these layers are somehow permanently or chemically "attached" to the substrate; however, the claims 11-13 do not require or recite that these layers on the substrate are attached chemically (in a covalent manner, for example), only that they are "on" the support, or on other layers of the support. Furthermore, for the purposes of the claimed invention, the teachings of Huang, where these elements are "on" the photoreceptor support prior to transfer to the target substrate also teaches that these layers are "on" the support. Absent a limitation which requires chemical attachment of the layers to the substrate, these arguments are not persuasive and the rejection is maintained.

Finally, regarding claim 12, Applicant argues "Huang, however, does not teach or suggest any selective chemical deprotection on the chemical functional layer disposed on the support, as required by independent claim 12" and "Huang expressly teaches that coupling reactions occur on the target substrate (164)" (p. 3 of remarks).

Again, while these arguments have been considered, Applicant is arguing a limitation which states "whereby a selected electric charge pattern may be generated on upon the substrate…to enable selective deprotection of the binder molecules" which amounts to an intended use of the substrate. Applicant is claiming a substrate, not a method. The structural limitation of this portion of the claim requires that the chemical functional layer "comprising at least in part a chemically active material to which a binder molecule can be attached". Regarding this issue, Huang teaches a chemical functional layer as noted in the rejection and teaches the selective formation of charge patterns generated on the photoreceptor support, prior

to transfer to the target substrate (see Figure 7), which meets the limitation of the claim. The rejection is maintained.

Applicant traverses the rejection of claims 1-10 as being obvious over Huang in view of Cabuz. Applicant argues again that Huang does not teach the features of the substrate as claimed. Regarding Cabuz, Applicant argues "Cabuz is directed to a microactuator array device, which includes a plurality of generally parallel thin flexible polymer sheets bonded together in a predetermined pattern to form an array of unit cells on at least one layer" (p. 4 of remarks). Applicant also highlights that the layers "function as electrodes". Applicant argues that "there is no teaching or suggestion that the dielectric layer disclosed in Cabuz is used to solve any problem in connection with selective micron and nanoscale deposition" and argue that "Cabuz is not an analogous art in that it is in a field different from Applicant's endeavor" and that it should be disqualified as a reference" (p. 4-5 of remarks).

In response to applicant's argument that Cabuz is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Cabuz is reasonably pertinent to the issue of forming layers of substrates and arrays. As noted in the motivation statement, "While Cabuz is directed to microactuators and Huang is directed to a photoconductor support, both references teach the formation of arrays on flexible surfaces with conductive characteristics.". Therefore, Applicant's argument that Cabuz should be disqualified is not persuasive.

Finally, regarding claim 10, Applicant argues that "the Examiner asserts that 'Huang teaches the target substrate can comprise a chemical functional layer'" and argue that "the fact that the target substrate (164) may have reactive groups which react with the transferred chemical compounds is irrelevant because the target substrate (164) is separate from the photoreceptor support" and that "the reactive groups are not part of the asserted substrate" and that the rejection is improper and should be withdrawn".

Applicant chose certain portions of the Examiner's statements regarding the target substrate and the photoreceptor support and neglected to mention the part of the rejection which notes that "Regarding claim 10, Huang teaches two separate supports, however, Huang teaches the target support can comprise a chemical functional layer as follows, and renders claim 10 obvious in view of the photoreceptor support and target supports considered together". Therefore, the rejection is not improper because the Examiner is noting that the specific reactive groups are not taught on the photoreceptor substrate. However, Huang teaching them on the target **renders obvious** placing them on the photoreceptor substrate, as part of an obviousness rejection. Therefore, the basis for the rejection is not improper and the rejection is maintained.

Relevant Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Loewy et al. (WO00/25936; May 2000) teaches a method for controlled electrostatic deposition of particles onto a substrate.

Conclusion

No claims are allowed. All claims stand rejected.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHANIE K. MUMMERT whose telephone number is (571)272-8503. The examiner can normally be reached on M-F, 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571-272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Stephanie K. Mummert/
Examiner, Art Unit 1637

SKM
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